APRIL/MAY 2024

CEL43/BEL43 — DIGITAL ELECTRONICS

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Convert the decimal number $(177)_{10}$ to binary.
2. Convert the decimal number $(180)_{10}$ to Octal.
3. State any two basic laws of Boolean algebra.
4. Prove that Boolean identities A+AB=A.
5. Draw the half adder logic circuit.
6. Give the truth table for full adder.
7. Define race condition.
8. Give the truth table for RS flip flop.
9. Define the accuracy of ADC.
10. Define resolution.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Perform the following

(i) $[845]_{10} = [\,]_2$

(ii) $[777]_8 = [\,]_{10}$

Or

(b) Explain the excess 3 and gray codes.

12. (a) Reduce the expression $F = \sum m(0,1,2,3,6,7,13,15)$ by K-Maping and draw the relevant logic circuit.

Or

(b) Reduce the following expression

(i) $\overline{\overline{AB} + \overline{A} + AB}$.

(ii) $AB + \overline{AC} + A\overline{B}C(AB + C)$.

13. (a) Explain the working of 4:1 multiplexer.

Or

(b) Explain the working of encoder.

14. (a) Explain the function of J-K flip flop.

Or

(b) Explain the function of T and D flip flop.

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15. (a) Discuss the DAC using variable resister network.

Or

(b) Discuss the ADC by successive approximation method.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the DAC using variable resister network.

17. Simplify the Boolean function using K-map and draw the logic circuit for it.

$F(A,B,C,D) = \sum m(0,1,2,3,4,5,6,7,10,14)$.

18. Explain the half subtractor and full subtractor with logic circuits.

19. Explain the 4-bit asynchronous ripple counter with necessary diagram. Give its truth table.

20. Explain the ADC by dual slope method.

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